

Lewis A. Sayre

The First Professor of Orthopaedic Surgery in America

Jay M. Zampini MD, Henry H. Sherk MD

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Abstract Lewis Albert Sayre (1820–1900) is considered to be among the founding fathers of orthopaedic surgery in the United States. He studied medicine at the College of Physicians and Surgeons (now of Columbia University). Sayre later helped establish the first academic department of orthopaedics at the Bellevue Medical College where he served as their first Professor of Orthopaedics. Lewis Sayre treated a considerable diversity of musculoskeletal conditions and meticulously documented them with written notes, sketches, and photographs. As a public figure, his methods were controversial, attracting praise by some and inviting criticism by other prominent members of the international community. He made great strides for physicians, helping to charter the American Medical Association and to establish the weekly publication of the *Journal of the American Medical Association*.

Introduction

The art of practice in any field of medicine today relies heavily on the efforts and advancements of our predecessors. Lewis Albert Sayre is one of our important forefathers in the field of orthopaedic surgery (Fig. 1). Born on February 29, 1820 in Bottle Hill, NJ, now known as Madison,

Sayre was one of 12 children of Archibald Sayre, a prominent local farmer [4, 10, 11]. On the death of his father around Lewis's tenth birthday, Sayre moved with his family to Lexington, KY, to live with his uncle, David Sayre, a prominent banker. There, he began his advanced education in 1837 by attending Transylvania University. Despite the attempts of his uncle to persuade him to become a banker instead, Lewis returned east to New York City to receive a Doctor of Medicine degree from the College of Physicians and Surgeons in 1842. (The College of Physicians and Surgeons, originally founded in 1807 as an institution of the New York Board of Regents, established a relationship with Columbia College only 7 years later in 1814, but retained autonomy until a formal merger in 1860, well after the time Sayre was there.) While at the College of Physicians and Surgeons, Sayre studied disorders of the spinal cord and spinal nerves and successfully defended a thesis on, "Spinal irritation," which was published shortly thereafter [11]. Sayre's interest in the treatment of spinal disorders eventually led him to great renown.

Lewis Albert Sayre remained in New York after graduation and served as anatomy prosector at the College of Physicians and Surgeons for 10 years. In 1853, he transferred his practice to Bellevue Hospital where he focused on diseases of the spine, bones, and joints. (Bellevue Hospital was also one of the oldest medical institutions in the country and probably the first public hospital in the United States, having been founded in 1736.) He also served as consultant to the 1000-bed Charity Hospital, the New York Small Pox Hospital, the Insane Asylum, the Hospital for Epileptics and Paralytics, and the Nursery Hospital. In 1861, the faculty and trustees of the hospital deemed Bellevue and its affiliates a prime location for medical education, a lucrative endeavor at the time.

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J. M. Zampini (✉), H. H. Sherk
Department of Orthopaedic Surgery, Drexel University College of Medicine, 245 N 15th Street, Mail Stop 420, Philadelphia, PA 19102, USA
e-mail: jmzampini@hotmail.com



Fig. 1 Lewis Albert Sayre served as professor of the first department of Orthopaedic Surgery in the United States (from the archives of the Bellevue Hospital Medical College; used with permission from the Ehrman Medical Library of the New York University School of Medicine).

Bellevue Medical College was opened [3]. Sayre was appointed to the faculty and named Professor of Orthopaedic Surgery, the first of such a position in America.

The Case Log of Lewis Albert Sayre

A review of Dr. Sayre's case log reveals his position as a progressive and innovative thinker for his time. He wrote about and illustrated extensively tuberculous arthritis of the hip, or morbus coxarius as it was known at the time (Fig. 2) [4, 9]. (While recognized as a medical entity from clinical descriptions, the tuberculosis organism was not identified until 1882 by Robert Koch.) Sayre described three stages of involvement of the hip in tuberculosis. The first stage was characterized by irritation or limited motion. The hip was painful but the relative length of the leg was unchanged from normal. The second stage was one of apparent lengthening of the involved extremity by joint effusion. The hip began to subluxate with the capsule remaining intact. The hallmarks of the third and final stage were limb shortening, rupture of the joint capsule, and complete destruction of the proximal part of the femur. Sayre was progressive in the way he treated severe tuberculous hip arthritis with surgery. He performed the second successful resection of the hip in 1854 following Henry Bigelow of Boston in 1852 [20]. In total, Sayre resected hips of more than 70 patients throughout his career. He described the procedure in his case log, over 70 years before a similar

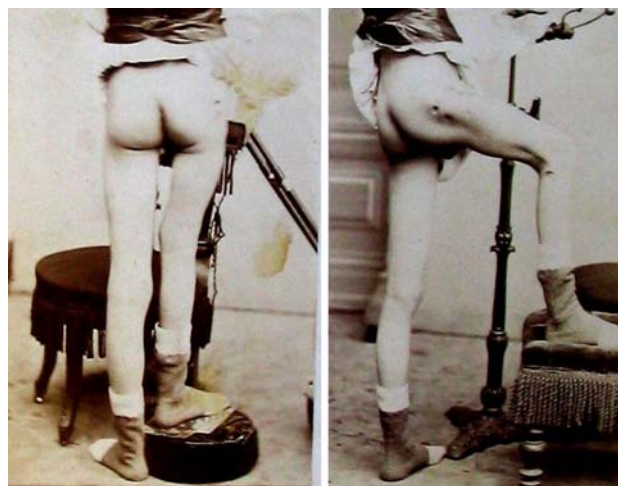


Fig. 2 This patient with tuberculous arthritis of the right hip was treated with exsection (from the archives of the Bellevue Hospital Medical College; used with permission from the Ehrman Medical Library of the New York University School of Medicine).

procedure was described and popularized by Girdlestone in the 1930s [3]:

"[I] placed the patient under chloroform and exsected the hip joint. Made an incision over the trochanter major parallel with os femoris. The periosteum was dissected from the bone and the latter sawed off just above the trochanter minor. The wound was kept open that it might suppurate freely. After the operation, the patient was placed in wire britches so that rest could be had and extension kept. The wound suppurated freely but the discharge became healthy in 7 or 8 days. Rapid pulse (160), high fever for the first week... got slowly better. Removed the wire britches after 3 months. He is now quite healthy, able to walk, has but little pain. Can walk about the street of NY with crutches and has but little shortness of the leg" [4].

Lewis Sayre treated a diversity of musculoskeletal conditions with nonoperative and operative techniques and became renowned worldwide for his writings on the treatment of spinal disorders. He wrote in 1895 in the New York Medical Journal of "The history of treatment of spondylitis and scoliosis by partial suspension and retention by means of plaster of Paris bandages" [18]. Patients were nearly suspended from their arms and head so that flexible scoliotic deformities of the spine could be corrected and immobilized in a cast (Fig. 3). The plaster of Paris body cast he used intending to correct the deformity came to be known as a Sayre jacket. Although the efficacy in permanently altering the disease process is questionable, the contribution to the development of modern techniques of body casting and bracing for scoliosis is clear.



Fig. 3 Idiopathic scoliosis was treated with partial suspension as shown, and retained with a plaster of Paris bandage (from the archives of the Bellevue Medical College Hospital; used with permission from the Ehrman Medical Library of the New York University School of Medicine).

Sayre acted as a public health advocate while serving as Commissioner of Public Health of New York City [4, 10]. He supported compulsory vaccination, quarantine for cholera, sanitary inspection of tenement houses, and improved facilities for sewage disposal during his tenure as Commissioner. However, his passion for improving public health did not end when he left the Commissioner's office but continued throughout his practice. He described one of his cases of May 1869 in which a woman 21 years of age presented to his clinic with progressive weakness and loss of power of all the extensors of both forearms and intrinsic musculature of the hands [4]. She had been seen by many physicians in New York City, none of whom could determine the etiology of the weakness. She then was sent to Philadelphia and Boston for consultation by some of the most prominent physicians of the time, also to no avail. When she finally presented her case to Sayre, the weakness had progressed and she had little hope that the cause could be determined or whether there could be any chance of cure. Dr. Sayre obtained an exhaustive history of the woman's life and social habits and discovered that she had been using cosmetics that contained considerable amounts of lead-based dyes. He instructed the patient to immediately stop using the lead-based cosmetics, and her disability remained stable. He prescribed range of motion exercises and fashioned functional braces for her to allow her to perform more meaningful activities in life. Moreover, the extent of Sayre's interest did not stop with the diagnosis and treatment. As a former Commissioner of Health, he



Fig. 4 General Harry Barnum was injured in the Civil War in 1862 and continued to use an India rubber drain tube for decades after surgical debridement (from the archives of the Bellevue Hospital Medical College; used with permission from the Ehrman Medical Library of the New York University School of Medicine).

was able to convince the board to investigate the use and amount of lead in women's cosmetics, pomades, and tonics. The Board of Health discovered considerably elevated levels of lead in many of the commonly used cosmetics and was able to discern brands with no or minimal amounts of lead. Sayre and the New York Board of Health were instrumental in banning further use of lead in women's cosmetics [4, 7, 11].

During his career, Lewis Sayre became widely known as a physician and surgeon. His patients often traveled from throughout the country for treatment. They wrote to him often, extolling his praises. He described, in 1884, a followup of General Harry Barnum, a patient he had treated 22 years earlier (Fig. 4) [4]. Barnum had sustained a gunshot to the pelvis in the Civil War in 1862 and chronic osteomyelitis had developed. He presented to Dr. Sayre who removed a large portion of his ilium and inserted an India rubber tube. He instructed Barnum to perform wound care, including removing, cleaning, and replacing the drain tube. Barnum complied and was able to return to active combat duty. He used and cared for the drain tube for the remainder of his life.

Sayre extensively documented his work with personal notes and written publications and public addresses [12–19]. He is said to have authored nearly 250 publications, however, many of the works are multiple concurrent printings of the same report in different journals [20]. His

best known works report the treatment of spondylitis, scoliosis and club foot, and his lectures delivered at Bellevue Medical College [12, 16–18].

The Public Life of Lewis Albert Sayre

Lewis Sayre was a highly public figure throughout his life. He practiced orthopaedics at a time when anesthesia and aseptic technique were in their infancies. Surgical intervention was not as eagerly embraced by all practitioners of orthopaedics. Charles Fayette Taylor also practiced orthopaedics in New York City, but did not advocate operative intervention [5, 6]. He publicly accused Sayre of unethical conduct in the way he performed new and generally unproven surgical procedures. Taylor demanded censure of Sayre by the New York Academy of Medicine but ultimately was unsuccessful.

Although the medicolegal environment of Lewis Sayre's time was different than it is today, physicians were not immune to allegations of malpractice. In *Walsh v Sayre*, Dr. Sayre was accused of performing "...an operation on the plaintiff so negligently and unskillfully as to puncture the joint of the plaintiff, causing the synovial fluid which lubricates the cartilaginous surface of said joint to escape, thereby seriously and permanently injuring the hip, rendering the whole leg useless and permanently lame and perhaps rendering necessary an amputation of the leg, at the risk of the patient's life" [21].

The report of the case describes how Sayre lanced an abscess of the left buttock near the greater trochanter of 6-year-old Margaret Walsh. The five witnesses, all of whom were physicians studying under Sayre, recall Sayre making a one-half-inch incision through which he, "Got pus, which gushed in a stream." The girl's mother became excited and seized her, running out of the office before a proper dressing could be applied. Although the girl's mother attested that she would rather have had her die than undergo an operation, Margaret Walsh did walk into the courtroom to testify in the case. With the evidence given by the witnesses, and the incompetent testimony of the alcohol abusing, poorly trained, and ethically questionable "expert," retained by the plaintiff, the case was decided in favor of Sayre.

Lewis Sayre was not without his supporters. He was a charter member of and activist in the American Medical Association (AMA), of which he served as president between 1880 and 1881 [1]. As an executive of the AMA, he convinced the association that publication of medical information, then on an annual basis as the *Transactions of the AMA*, did not adequately address the changing medical times. Soon thereafter, the *Journal of the AMA* was chartered. Additionally, and after his initial objection to its creation, Sayre was made a member of the American

Orthopaedic Association (AOA) in 1889 [11, 20]. The first president of the AOA, Virgil Gibney, was a protégé of Sayre and publicly defended Sayre's integrity. Furthermore, Sayre regularly received letters of praise from patients throughout the country. His good reputation, however, extended beyond the borders of New York and the United States. While in Europe, he once treated the son of King Charles XV of Sweden. The royal family was so impressed with their son's treatment that they bestowed knighthood on Lewis Sayre: "We have as our Royal Grace and Good Will proclaimed him, Lewis A. Sayre, a Knight of the Order of Wasa, of which we ourselves are head" [7, 8].

Lewis Sayre married Elizabeth Ann Hall in 1849 and produced one daughter and three sons [7]. Each of his sons followed him in the practice of orthopaedic surgery. His sons Lewis Hall Sayre and Reginald Hall Sayre were among the founders of the American Orthopaedic Association. Lewis served as the first secretary-treasurer of the association and Reginald as the eighteenth president. Sayre's daughter Mary Hall Sayre, did not follow her father into medicine, but became a talented linguist. She occasionally would translate medical works from other languages into English for her father. Although three of his children did not have children of their own, Lewis Hall did produce two sons and a daughter to continue the Sayre family lineage. At least one descendent, James W. Sayre, a great great nephew, continues to practice medicine today [11].

Lewis Albert Sayre played an important role in the development of orthopaedic surgery in the United States. He believed in the importance of a national forum in which orthopaedists could discuss and advance their practice and was instrumental in the establishment of the AOA. As a public health advocate, he initiated important measures to protect the wellness of the population he served. Finally, as an academic, he held high the principles of the physician-scientist to improve his practice and advance his knowledge by asserting that he "must be permitted to question what is questionable and to doubt what is doubtful."

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